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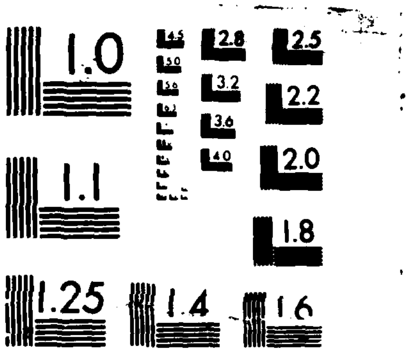

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Issues In The Development Of A Competency Scale: Implications For Linking Job Performance And Aptitude

by

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The selection of test content and the construction of job performance tests have not followed any specific methodology. Test content has often been limited to tasks that are: most frequently performed on the job, easily tested in the hands-on mode, or selected to maximize differences in individuals' performance. The problem with such test development procedures is that the resulting score scale allows for little, if any, independent interpretation of the test scores, other than normative comparisons. For the purpose of validating the Armed Services Vocational Aptitude Battery (ASVAB), such relative interpretations may suffice. But for determining qualification standards on the ASVAB, a more absolute interpretation is required of the performance test scores. Therefore, a systematic methodology is necessary for job performance test construction so that meaningful score interpretation and linkage with ASVAB will be possible.

Significant research has been conducted in the achievement testing arena that provides some guidance for the development of job performance tests, particularly work on domain-referenced testing. A domain-referenced test consists of a sample of tasks from a well-defined population of tasks, such that the sample estimates the proportion of tasks that an individual would be expected to achieve in the population. This definition contains two essential components: specification of the task domain and appropriate sampling of tasks from that domain so that the part will represent the whole. Given that these two conditions have been met, a domain-referenced test measures an individual's degree of knowledge on a continuum of no proficiency to complete proficiency. For our application to the measurement of job performance, we define this continuous scale as a competency scale. More specifically, competency is defined as the percentage of tasks correctly performed in the full task domain which is estimated by the percentage of

tasks correctly performed on the test.

Our definition of competency does not focus on the division of the continuous scale into discrete qualitative categories (e.g., competent versus incompetent, or master, journeyman, apprentice, etc.). Rather, our focus is on developing an objective and reasonable procedure with explicit rules for scale construction that will allow for direct interpretation of the resulting test scores. It should be noted that the domain-referenced approach to developing a competency scale does not preclude the setting of standards. Therefore, to the extent that the conditions of domain specification and task sampling are upheld, the resulting score scale of the test can be interpreted in an absolute manner. We now turn to examining these two critical components for constructing a competency scale for the hands-on tests for the Marine Corps infantry occupational field.

SPECIFICATION OF THE TASK DOMAIN

For the purpose of relating job performance test scores to ASVAB, the performance test must first be firmly based on a detailed specification of the job requirements. Within the military community, extensive research has been conducted on the definition of jobs and the delineation of their specific requirements and responsibilities. This research provides an excellent foundation for explicitly defining the tasks that are required in any job.

Individual Training Standards

Within the Marine Corps, the Individual Training Standards (ITSs) define the tasks that are required of each Marine, the level of competence to which the tasks must be performed, and what stage in the career of the Marine this competency is expected. The ITSs serve as the definitive statement of an MOS's job requirements because they are:

- Comprehensive: a thorough process synthesizing multiple sources of

information (e.g., occupational surveys, task analyses, job experts, subject matter experts, training materials, etc.) which receives significant review and verification from the field.

- Independent: job requirements are defined independent of the JPM Project and therefore are not necessarily biased towards including only those requirements that are easily tested or would maximally discriminate between individuals.

- Reproducible: a published Marine Corps Headquarters standing operating procedures (SOP) exists to document the entire developmental process of the ITSs and to allow for replication.

- Official Marine Corps policy: the ITSs are completely staffed, reviewed, and approved by Marine Corps Headquarters, the Division Commanders, the training schools and institutes, and the Fleet Marine Forces, so that the ITSs become the doctrinal statement of the job requirements for an MOS.

The ITSs are central to the Marine Corps JPM Project. If ITSs are not available for a particular MOS, the Marine Corps would not consider that specialty for the development of job performance tests.

The ITS tasks for the infantry occupational field are organized by MOS and sorted into relatively homogeneous duty areas within each MOS. The duty areas and associated number of tasks for the five infantry MOSs to be tested in the Marine Corps JPM Project are given in appendix A. For a given task, the ITSs are composed of the following components:

Task. Description of what the Marine needs to be able to do in combat. The task has a specific beginning and ending, and is a logical and necessary unit of performance.

Administrative instructions. Directions for test administration and the degree of simulation necessary to measure the task.

Training objective.

Behavior. The action to be performed by the Marine. Some behaviors are identical to tasks, which implies that the behavior can be performed in training environments just as the task would be performed in combat.

Conditions. Equipment, manuals, assistance, supervision, special physical demands, environmental conditions, and location that pertain to performing the task.

Standard. Accuracy, time limits, sequencing, quality, product, process, etc., that indicate how well a task should be performed.

Training steps. The steps that must be performed in order to accomplish the training objective.

References. Manuals, job aids, field manuals, etc., that are not listed in the Conditions section that will guide trainers, instructors, or performers.

Table 1 presents an example of an ITS for one of the four tasks in the M203 grenade launcher duty area.

In addition to the 57 tasks defined for the thirteen duty areas of basic infantry, the ITSs also reference Essential Subject Tasks (ESTs) that are integral to performing the duties of an infantryman. The ESTs are basic tasks that are required of all Marines. Marines are tested annually on a sample of these tasks, but this annual qualification is used as a training exercise and does not adhere to acceptable measurement principles. The ESTs that extend and supplement the ITSs are:

- First aid and field sanitation
- Nuclear, biological, and chemical defense
- Marksmanship
- Individual tactical measures

TABLE 1

INDIVIDUAL TRAINING STANDARD FOR ONE TASK OF THE M203 GRENADE LAUNCHER

Task: Engage target with grenade launcher.

Administrative instructions: This ITS is identical to the actual task. Targets may be constructed using locally available material. All students at Infantry Training School will perform this ITS. The ITS must be performed quarterly by grenadiers in conjunction with zeroing the weapon.

Training objective:

Behavior: Engage target with grenade launcher.

Conditions: The Marine being evaluated is provided: M203 grenade launcher and seven rounds of 40mm HE DP or practice ammunition on a live-fire range.

Standard: Obtain hits on three of the following four targets:

- From a kneeling position, place a round through a window (.75 meters wide by 1 meter high) at a range of 90 – 100 meters.
- From a fighting position, hit the front of a bunker at a range of 135-150 meters.
- From a prone position, hit within 5 meters of targets in an open emplacement at a range of 275-300 meters.
- From a prone position, hit within 5 meters of targets in the open at a range of 325-350 meters.

TABLE 1 (Continued)

Training steps:

- Set rear sight.
- Establish position.
- Aim.
- Fire round, sense the impact of the grenade, and make sight adjustment.
- Take immediate action, if necessary.

References:

- FM 21-2, Soldier's Manual of Common Tasks, Skill Level 1, pages 3-114 through 3-119.
- TM 9-1010-221-10, Operator's Manual, 40mm Grenade Launcher M203, pages 18-22.
- FM 23-31, M203 40mm Grenade Launcher, chapter 6.

Source: Individual Training Standards (ITS) System for Infantry, Occupational Field (OccFld) 03, MCO 1510.35A.

- Land navigation.

Therefore, the ITSs, supplemented by the ESTs, serve as the official Marine Corps statement defining the domain of job requirements for the infantry occupational field. Certainly, the ITSs do not purport to specify all the possible responsibilities of an infantryman, but rather document at least those aspects of the job that the Marine Corps believes to be most critical to the functioning of an infantryman in combat.

Determining the Behavioral Elements of Tasks

By themselves, the ITSs provide little information about the underlying skills, knowledge, and behaviors required of the tasks that compose an MOS. Sampling of test content with regard only to tasks may be somewhat misleading because one can not explicitly identify the specific behaviors that are being measured nor assure that all behaviors relevant to the performance of the job are even being tested. The ultimate inference of test scores is to the range of job behaviors required for a duty area, not to the set of tasks that compose that duty area. Ultimately, the level of generalization of behaviors will be to the MOS, and ideally even across MOSs. Incorporating behavioral elements into the test construction process will help to facilitate these generalizations.

To identify the behaviors inherent in the tasks of the ITSs, the Marine Corps JPM Project conducted task analyses and relied upon job experts to construct behavioral elements for each ITS task. The behavioral elements are generic verb-noun statements denoting identifiable units of performance that underlie the performance of the ITS tasks. In this regard, the behavioral elements provided a qualitative basis for understanding the inherent behaviors of a task as well as the means to make comparative statements of behavioral similarity across tasks.

Behavioral element by task matrices were constructed for each duty area of the infantry occupational field. Figure 1 presents the matrix developed

0300	Inspect Grenade Launcher		Maintain Launcher	Zero Grenade Launcher					Engage Targets	Engage Targets Using Limited Visibility Techniques		
M203 Grenade Launcher	Visual Inspection	Operation Inspection		Prepare launcher for Firing	Fire launcher	Correct Leaf Sight (Battle Zero)	Correct Quadrant Sight	Confirm Zero		Emplace Stakes	Fire	Prepare Range Card
Clear M16 Rifle	X	X	X	X					X		X	
Clear Launcher	X	X	X	X					X		X	
Check for Rust, Dirt, Cracks, Lube & Bulges on Launcher	X											
Function Check Launcher		X										
Clean Launcher			X									
Lube Launcher			X									
Oil Firing Pin Hole			X									
Load Launcher				X				X	X		X	
Aim/Fire					X			X	X		X	
Take Immediate Action					X			X	X		X	
Analyze Round on Target						X	X	X				
Adjust Windage Scale & Elevation Screw						X						
Adjust Rear Sight Aperture & Elevation Screw							X					
Set Rear Sight									X			
Adjust Sights as Necessary									X			
Place Stakes to Sector of Fire										X		
Place Stakes to PDF or FPL										X		
Determine Distances & Directions												X
Sketch Information												X

Fig. 1 Behavioral Element by Task Matrix for M203 Grenade Launcher Duty Area

for the M203 grenade launcher duty area. The five tasks that compose this duty area are across the top of the matrix with the behavioral elements that underlie those tasks in the leftmost column. The diagonal words under the tasks correspond to the training steps of the tasks, but are not necessarily the training steps as listed in the ITSs. Job experts reviewed each task to produce comparable performance units that were on the same level of specificity - the ITSs training steps were reworked to establish these units. Much attention was devoted to this equating of training steps because they will eventually be used as the sampling units for test content.

Marine Corps job experts at two of its three Divisions reviewed the matrices. The experts examined the matrices a column at a time to determine that indeed each behavioral element was required of that training step. Behavioral elements were reworded and refined, and missing behaviors were added to the list. Next, the experts reviewed the matrices a row at a time to ensure that the behavioral elements were comparable across the training steps. Elements were collapsed or expanded as thought necessary by the expert panel. Finally, the matrices were reviewed in their entirety to be certain that the total picture completely represented the duty area. Given the approval of these two independent panels of experts, the behavioral element by task matrices established the domain of job requirements for each duty area in terms of specific tasks and common behaviors.

SAMPLING TEST CONTENT

Resources for hands-on performance testing are limited - limited in terms of personnel, testing time, budget, etc. Given that the entire domain of job requirements can not be tested due to these constraints, a sample of the domain must be selected so that inferences about an individual's level of competency can be made from his performance on a partial set of the tasks. Therefore, in addition to a detailed specification of the task domain and the associated behaviors that define a job, an explicit plan for determining which specific tasks will be tested is necessary. This sampling strategy involves three stages: defining the sampling unit, establishing the sampling rules, and sampling test content and constructing testable units.

Defining the Sampling Unit

Implicit in the sampling process is that a selection is being made among discrete units that have clearly defined boundaries and limits. Also, the units are considered to be equal or interchangeable, although they may have different probabilities of being sampled. These conditions pose strict requirements and fundamental difficulties for the application of sampling techniques to job requirements.

Jobs can not readily be decomposed into discrete and independent units of performance. While tasks are often grouped to define a job, the collection of tasks is often arbitrary or a matter of convenience. Tasks are not natural entities unto themselves, but rather are amorphous groupings of many behaviors. Selection among such arbitrary units of performance can not result in a test that is representative of the whole domain of job requirements. The solution involves extensive analyses to refine the tasks into equivalent performance units that are amenable to sampling.

Establishing the equality of performance units – or defining the sampling unit – is based completely upon the input of job experts. This use of job experts for definitional purposes should not be confused with the use of experts for judgment-based selection of tasks. In our application, the job experts are used to delimit the boundaries of the sampling units and to ensure their equality, not to determine which units will be tested. Therefore, it is our contention that expert input is required only on matters that demand job knowledge or could benefit from their past experiences. This excludes selection decisions that may be influenced by individual preferences or bias. Selection decisions among alternatives judged to be equivalent by job experts is best accomplished by sampling.

Given the scope and noted arbitrariness of tasks, the Marine Corps JPM Project focused on the training step within a task as the sampling unit. Our definition of the training step as the sampling unit is not com-

pletely consistent with the ITS definition of a training step. Based upon extensive expert review of the ITSs, some ITS training steps were collapsed, others were refined, so that the resulting performance units were considered comparable. The redefined training steps were thought to be meaningful units of performance that maintained their fidelity to the overall task while not trivializing the performance requirements. Figure 1 shows the behavioral element by task matrix that defines the job requirements for the M203 grenade launcher. The training steps listed under each task were judged by job experts to be essentially equivalent. These training steps will serve as the units to be sampled and thereby determine the hands-on test content.

Establishing the Sampling Rules

Having obtained equivalent sampling units, systematic and defensible sampling rules must be made explicit. These rules explain any constraints within which the sampling must be conducted. The sampling rules for the basic infantryman content are listed below:

- All duty areas defined in the ITSs for the basic infantryman MOS (0300) in pay grades E1-E3 will be tested.
- Total testing time will be limited to 6 hours. Actual testing time will be up to 250 minutes, plus up to 110 minutes of administrative time.
  - The actual testing time for any duty area will range from 10 to 30 minutes.
- Any training step can be eliminated from the sampling process for the following reasons:
  - Hazardous or expensive: includes live firing of most weapons (except the M16A2 rifle) and crossing a contaminated area for the NBC duty area.
  - Expert judgment that the step provides little or no information: applies to trivial or repetitive training steps (this does not trans-

late into the exclusion of simple training steps).

Requiring all basic infantryman duty areas to be tested reflects the Marine Corps position that all duty areas included in the ITSs are important and critical to the performance of an infantryman.

Testing time is certainly the most dominant constraint on the sampling plan. If unlimited testing time were available, the full domain of job requirements could be tested in each duty area. To the extent that the time required to test the full domain does not match the available testing time, the reliance on sampling becomes more important. While the first sampling rule states that all duty areas are important (and therefore warrant testing time), it does not address the issue of relative importance among duty areas (i.e., different allotment of testing time across the duty areas).

Job expert ratings of importance and criticality were collected for the duty areas of the basic infantryman MOS to provide a basis for the allocation of testing time. The ranking of duty areas according to these ratings is reported in table 2. In addition, estimates of the total time to test the full domain of job requirements for each duty area are noted in the table. In general, the importance ranking was confirmed by the number of training steps and behavioral elements associated with each duty area - that is, the more important duty areas tended to have more training steps and behavioral elements. The NBC defense and first aid duty areas are somewhat misleading because they were extensively supplemented by the ESTs.

Based upon the importance ranking of table 2, it follows that testing time should be allocated to duty areas accordingly or to cover the full population of training steps, whichever is less. The full domain of job requirements can be tested for three duty areas: SAW, LAW, and hand grenades. For each of these duty areas, the available testing time equaled the required time to test the full domain. The panels of job experts also made decisions concerning the testing time for each duty area. First, ten minutes was thought to be the minimum time in which any duty area could be meaningfully tested. Second, given the large number of duty areas to be

TABLE 2

IMPORTANCE RANKING AND TESTING TIMES FOR DUTY AREAS OF THE BASIC INFANTRY MOS

Duty area	Importance ranking	Training steps	Behavioral elements	Total time	Testing time
Land navigation	1	16	53	66	30
Tactical measures	2	11	59	368	30
M16A2 rifle	4	15	56	240	30
SAW	4	5	10	14	15
NBC defense	4	28	85	145	20
First aid	6	21	107	113	20
Communications-radio	7	10	31	90	20
Security and intelligence	8	9	36	25	15
Grenade launcher	9	12	41	69	15
Mines	10	10	52	156	15
Night vision device	11	5	17	28	10
Communications-telephone	12	7	21	33	10
LAW	13	6	20	12	10
Hand grenades	14	3	10	10	10

covered, thirty minutes was established as the maximum amount of time to be devoted to any one duty area. Finally, the duty areas were grouped and time limits were assigned to each block as shown in table 2. In essence, the testing times become relative weights of the duty areas and also have implications for the scaling of the hands-on test scores.

The final sampling rule eliminates some training steps from being considered in the sampling process. Essentially, this eliminates many of the training steps that require live firing of weapons. However, training steps involving weapon systems that contain components other than just firing the weapon are not eliminated, just the specific component to fire is deleted. For example, engaging the target with the M203 grenade launcher (see figure 1) requires more than firing the launcher. It is still possible to test clearing the M16A2 rifle and launcher, loading the launcher, and taking immediate action and adjusting sights based upon simulated feedback of the firing.

The second eliminating condition of repetitive or trivial steps is included to ensure efficient use of the testing time. Efficiency implies maximum information for the minimum amount of testing time. For example, the total time listed in table 2 for the tactical measures duty area is 368 minutes. Two thirds of this time is required for the training step of "construct fighting hole." Certainly, there are required techniques and specifications for the digging fox holes and these concepts can be tested, but actually digging a hole is not efficient use of testing time.

Selecting Test Content and Constructing Testable Units

Selecting test content involves more than randomly sampling among equivalent training steps within duty areas. Our strategy is to maximize test content coverage across the behavioral elements, while not excluding the possible replication of behavioral elements. In this manner, the emphasis is placed on measurement of the underlying behaviors associated with the performance of job requirements and not on specific tasks or training steps. Both dimensions of the behavioral element by task matrix (given in

figure 1) enter into the sampling process, not just the task dimension which has been the customary practice in the construction of hands-on tests.

The sampling of training steps is conducted within each duty area. To maximize test content coverage across the behavioral elements, each training step not excluded by the previously discussed criteria is weighted with respect to its behavioral elements. Table 3 presents the weights for a hypothetical sampling of training steps for the M203 grenade launcher duty area. For the first round of the sampling process, the sampling weight for each training step is merely the number of behavioral elements that it contains. Therefore, the training steps with the greatest number of behavioral elements have the highest likelihood of being sampled. A training step is randomly sampled from the pool of weighted training steps. In our example with the M203 grenade launcher, the first randomly selected training step was "correct the leaf sight."

The selection of a training step establishes the general content area to be tested, but the training step does not directly translate into what will be scored as pass or fail on the hands-on test. At this point, a thorough task analysis of the training step is conducted to refine the training step into a "testable unit." The task analysis identifies the basic steps necessary to complete the training step, including the conditions and standards of performance, sources of likely failure, and indications of exceptionally good performance. The task analysis is reviewed by job experts. Representative infantry job incumbents also review the analysis from the perspective of how they perform the steps. In addition, the criteria used earlier to screen the training steps are applied at the step level of the task analysis. That is, steps of the task analysis are deleted if they are hazardous or too expensive to test or, in the opinion of job experts, provide little or no information. Therefore, the testable unit may be somewhat smaller than a complete training step and may possibly exclude part or all of some behavioral elements. The result of the task analysis is a test item for the hands-on test, a testable unit.

The amount of testing time required to complete the testable unit is

TABLE 3

A HYPOTHETICAL EXAMPLE OF SAMPLING OF TEST CONTENT FOR THE M203 GRENADE LAUNCHER DUTY AREA

Panel A: Training Steps and Sampling Weights

Training step	Behavioral elements	Total time	Sampling weights by round			
			1	2	3	4
Visual inspection	3	2	3	3	1	1
Operational inspection	3	4	3	3	1	1
Maintain launcher	5	32	5	5	0	0
Prepare launcher to fire	3	3	3	3	1	1
Fire launcher	2	3	2	2	2	2
Correct leaf sight	2	3	2	0	0	0
Correct quadrant sight	2	3	2	1	1	1
Confirm zero	4	3	4	3	3	3
Engage targets	7	3	7	7	5	5
Emplace stakes	2	3	2	2	2	0
Fire - limited visibility	5	3	5	5	3	3
Prepare Range Card	2	7	2	2	2	2

Panel B: Randomly Selected Test Content and Testing Times

Round	Testable unit	Testing time
1	Correct leaf sight	2
2	Maintain launcher	8
3	Emplace stakes	3
4	Prepare range card	4

estimated based upon the task analysis. Approximately 2 minutes are necessary to correct the leaf sight of the M203 grenade launcher in a testing situation. This time is subtracted from the allocated testing time for the grenade launcher noted in table 2, resulting in 13 minutes being available to test other content.

Sampling weights for the remaining training steps are recomputed. The two behavioral elements of the "correct leaf sight" training step are excluded from entering into the sampling weights of the other training steps. The sampling weights for the second round of sampling are noted in table 3. Since the behavioral elements of the first selected training step were not common to many other training steps, the sampling weights are not dramatically changed.

The random sampling of weighted training steps continues until the testable units exhaust the allotted testing time for the duty area. For the M203 grenade launcher, the following training steps were randomly selected and refined into testable units until the fifteen minutes for the duty area were depleted: maintain launcher, emplace stakes, and prepare range card. If complete coverage of the behavioral elements is achieved before the testing time is consumed; i.e., sampling weights for all training steps equal zero, then the sampling process begins anew with all behavioral elements contributing to the sampling weights for those training steps yet to be tested.

Alternate forms can readily be produced by simply repeating the sampling technique. The resulting forms are parallel, being only randomly different. The testing conditions can be changed if the same training step is selected for both forms or the testable unit within a training step can even be redefined.

SUMMARY

It has been our purpose to present an objective procedure for constructing a hands-on job performance test - a procedure with a somewhat different focus than previously used methodologies. That is, we would like to

be able to interpret the resulting test scores in an absolute sense. It is our belief that a domain-referenced approach is necessary for the linkage of job performance and aptitude in determining standards on the ASVAB. This absolute interpretation of test scores, which we called competency-based measurement, is based upon two critical requirements of the test construction process: detailed specification of the job requirements domain and appropriate sampling of test content from that domain. Having satisfied these two criteria, an individual's level of competency is estimated by the percentage of training steps correctly performed on the hands-on test.

Existing research by the services provides an excellent foundation for the specification of the job requirements domain. However, such materials must be supplemented with additional analyses to identify the behaviors associated with performing the job. In this manner, the behavioral dimension serves as a means to generalize across training steps, tasks, duty areas, and ideally across MOSs. The end product is a behavioral element by task matrix that completely defines the job requirements domain. This matrix serves as the basis for selecting test content.

Any selection technique of test content *must* involve job experts. Their knowledge and expertise are critical throughout the entire process: from defining the sampling unit and establishing the sampling rules, to refining the training steps into testable units. Such participation is necessary to ensure that the resulting decisions are salient, reasonable, and generally acceptable. However, job experts do not actually make specific selection decisions, but rather they provide explanation, description, and definition of different aspects of the job requirements. Having established the boundaries and limits among decision alternatives, random sampling is the most appropriate means of making the actual selection.

Sampling of equivalent training steps involves both dimensions of the behavioral element by task matrix. Traditional construction procedures have tended to sample only the task dimension. However, our strategy has been to maximize coverage across the behavioral element dimension by weighting the training steps in proportion to their number of unique behav-

iors. This process does not exclude the possible replication of measurement by behavioral elements but does seek to cover as broad a range of behaviors as is feasible.

It is our belief that the competency-base test construction approach described in this paper is responsive to the ultimate purpose of the JPM Project: to establish defensible qualification standards on the ASVAB based upon hands-on measures of job performance. In addition, we feel that the consideration of the behavioral characteristics of jobs will greatly facilitate the generalization of results to MOSs that will not be tested.

APPENDIX A

DUTY AREAS OF THE INFANTRY OCCUPATIONAL FIELD

TABLE A-1

DUTY AREAS OF THE INFANTRY OCCUPATIONAL FIELD

Basic Infantryman (0300)

1. Tactical measures, 11 tasks
2. Security and intelligence, 4 tasks
3. Night vision device, 2 tasks
4. M16A2 service rifle, 2 tasks
5. M203 grenade launcher, 5 tasks
6. Squad automatic weapon (SAW), 2 tasks
7. Light antitank weapon (LAW), 3 tasks
8. Hand grenades, 3 tasks
9. Mines, 5 tasks
10. Communications, 10 tasks
11. Land navigation, 3 tasks
12. First aid, 2 tasks
13. Nuclear, biological, and chemical, 5 tasks

Infantry Rifleman (0311)

1. Tactical measures, 5 tasks
2. Squad automatic weapon (SAW), 5 tasks

TABLE A-1 (Continued)

Machine Gunner (0331)

1. M60 machine gun, 10 tasks
2. M2 machine gun, 13 tasks
3. MK19 machine gun, 12 tasks

Mortar Man (0341)

1. 60mm mortar, 18 tasks
2. 81mm mortar, 14 tasks

Assaultman (0351)

1. Dragon, 4 tasks
2. SMAW, 5 tasks

Infantry Unit Leader (0369)

1. Tactical measures, 3 tasks
2. Operations, 5 tasks
3. 81mm mortar, 3 tasks
4. Mines, 1 task

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1. CNA Professional Papers with an AD number may be obtained from the National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22151. Other papers are available from the Management Information Office, Center for Naval Analyses, 4401 Ford Avenue, Alexandria, Virginia 22302-0268. An index of selected publications is also available on request. The index includes a listing of professional papers, with abstracts, issued from 1969 to December 1983).
2. Listings for Professional Papers issued prior to PP 407 can be found in *Index of Selected Publications (through December 1983)*, March 1984.

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